

Application Serial No: 09/983,047
In reply to Office Action of 03 September 2003

Attorney Docket No. 78381

REMARKS

Claims 1-14 are currently pending in the application. Claims 1, 2, 4-6, 8, 9 and 11-14 are rejected. Claims 3, 7 and 10 are objected to. Claims 1, 3, 7, 10, 11 and 13 are amended.

The Examiner requested that Applicant update the status of application serial no. 09/983,046. By the present amendment, the status of this application has been updated to indicate that it has now matured into a patent.

The Examiner rejected claims 1, 2, 4 - 6, 8, 9, and 11-14 under 35 U.S.C. § 102(e) as being anticipated by Schroeder et al. (ref A: U.S. Patent No. 6,218,651). The Examiner contended that Schroeder et al. disclosed an apparatus comprising at least one optical fiber supported in a structure, a movable mass supported within the structure and means for detecting changes in tension in the at least one optical fiber due to movement of the movable mass. The Examiner further contended that Schroeder et al. disclosed an apparatus wherein the detecting means comprise at least one fiber optic Bragg grating written into a core of each of said optical fibers and wherein the detecting means comprise a plurality of fiber optic Bragg gratings associated with each optical fiber with each of the optical fibers having a different reflective wavelength and a Bragg grating laser sensor associated with each optical fiber.

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The Examiner further contended that Schroeder et al. disclosed an apparatus wherein the structure comprises a cage and wherein a gap is provided between each side of the mass and cage, with the gap being sufficiently small to limit motion of the mass in shock or high acceleration and to limit the maximum tension seen by each of the optical fibers. The Examiner further contended that Schroeder et al. disclosed an apparatus wherein the optical fibers are the only deformable structure within the sensor.

The Examiner objected to claims 3, 7 and 10 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The foregoing rejection is traversed by the present response.

The present invention relates to a sensing device which can be used as a roll sensor and/or a pitch sensor for a towed array. The sensing device broadly comprises at least one optical fiber supported at two ends in a structure with a fiber portion between the two ends being unsupported by the structure, a movable mass suspended within the structure by the unsupported portion of the at least one fiber, and means for detecting changes in tension

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in the at least one optical fiber due to movement of the
movable mass.

In Applicants' prior response, Applicants explained how the instant invention differs from the device described in the Schroeder et al. patent. Those remarks are incorporated by reference herein. Applicants would again point out to the Examiner that Schroeder et al. lacks any means for detecting changes in the tension of at least one optical fiber. In making the rejection of claims 1, 11, and 13 over Schroeder et al., the Examiner cites all the elements of what is described in Schroeder et al. as being a pressure/strain sensing system as being the claimed tension detecting means. Missing from the rejection is any discussion of how this pressure/strain sensing system detects tension changes in at least one optical fiber. The Examiner has failed to recognize once again that the subject invention is a gravity vector sensor while Schroeder et al.'s device is a pressure sensor. In the device of the present invention, a vector measurement is being made and the direction of the force is determined. This differs from Schroeder et al. which only measures a scalar quantity.

Nevertheless in order to expedite prosecution, Applicants have chosen to amend the claims which reached the Final Rejection issues to further describe how the

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optical fibers are supported and how they have an unsupported portion. Applicants have still further chosen to describe that the movable mass is suspended within the structure by the unsupported portions. Thus, each of claims 1, 11, and 13 has been amended to include the following limitations:

"a plurality of optical fibers supported at two ends in a structure, each said optical fiber having a fiber portion between said two ends unsupported by said structure" and

"a movable mass suspended within the structure by the unsupported portions of said optical fibers".

It is submitted that Schroeder et al. does not teach or suggest anything in his device which would meet the foregoing limitations. In Schroeder et al., the mass rests on a fiber which in turn rests on a base plate.

Claims 2, 4, 5, 6, 12, and 14 are allowable for the same reasons as claim 1, as well as on their own accord.

Objected to claims 3, 7, and 10 have been placed into independent form. Thus, claims 3 and 7 - 10 are now in condition for allowance (claims 8 and 9 depend from claim 7).

For the above reasons, all the claims in the case 1-14 are now believed to be in condition for allowance. Re-

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examination and favorable reconsideration in light of the
above amendments and comments are respectfully requested.

The Examiner is invited to phone Michael F. Oglo,
attorney for Applicants, 401-832-4736, if in his opinion
such phone call would serve to expedite the prosecution of
subject patent application.

Respectfully submitted,

GREGORY H. AMES ET AL.

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